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**BEFORE THE PUBLIC UTILITIES COMMISSION
OF THE STATE OF CALIFORNIA**

Order Instituting Rulemaking to Implement the
Commission's Procurement Incentive Framework
and to Examine the Integration of Greenhouse Gas
Emissions Standards into Procurement Policies.

Rulemaking R.06-04-009

CEC Docket no. D.07-OIIP-01

**COMMENTS OF THE GREEN POWER INSTITUTE
ON MODELING-RELATED ISSUES**

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Introduction

Pursuant to the November 9, 2007, *Administrative Law Judge's Ruling Requesting Comments on Modeling-Related Issues*, as modified by the November 30, 2007, *Administrative Law Judge's Ruling Extending Comment Deadlines and Addressing Procedural Matters*, in R.06-04-009, the **Order Instituting Rulemaking to Implement the Commission's Procurement Incentive Framework and to Examine the Integration of Greenhouse Gas Emissions Standards into Procurement Policies**, the Green Power Institute (GPI) respectfully submits these *Comments of the Green Power Institute on Modeling-Related Issues*. Our Comments address the issues and questions in the November 9, 2007, ALJ's *Ruling*.

Emissions Reduction Measures

Attachment A of the November 9, 2007, *Ruling*, identifies a range of greenhouse-gas reduction options that have the potential to provide significant contributions towards compliance with California's landmark greenhouse gas regulatory legislation, AB 32. The GPI believes that two of the measures discussed in the Attachment, efficiency and renewables, are capable of providing the bulk of the emissions reductions needed to achieve the legislation's goals in the electricity sector. No other preferred resources can provide quantitatively-equivalent levels of contribution to the effort in the timeframe specified.

AB 32 requires California to reduce its total greenhouse gas emissions to 1990 levels by 2020, which is a mere twelve years away. From the perspective of technological innovation and development in an industrial sector as capital-intensive as energy, twelve years is not very long at all. Compliance with the law will have be achieved primarily with

existing commercial technology, and with new technology that is already well along in the developmental pipeline. The good news is that a combination of commercially proven and already emerging technology is available, and more than up to the job. Compliance with AB 32 does not have to be predicated on technology that may or may not become commercially available before 2020. Any new technological developments that can be brought to market will just be icing on the cake.

Current and Future of the RPS Program

In discussing the current state of California's RPS program, Attachment A of the *Ruling* states, on pgs. 4-5: "Forecasts show that IOUs are more or less on track to comply with RPS requirements through the 2010 target dates." A footnote acknowledges that the utilities' own procurement plans forecast achievement of the twenty percent renewables benchmark not by 2010, but by 2011 – 2012. In our opinion, neither of these positions is realistic. The GPI has consistently pointed out to the Commission that the utilities are currently on trajectories to reach the twenty percent benchmark by 2013 at the earliest, and that achieving the benchmark by 2013 is far from assured. Moreover transmission, while a serious barrier, is by no means the only barrier to achieving the state's renewables goals.

The recent Commission Decision on the IOUs' long-term procurement plans, D.07-12-052 in R.16-12-013, expresses disappointment with the way that the utilities are implementing California's preferred resource loading order, as defined in the state's *Energy Action Plan*.¹ We agree, and we caution the Commission against assuming that achievement of the twenty-percent renewables benchmark on time, or within a year thereof, is in any way likely to occur. The IOUs are not "more or less on track to comply with RPS requirements through the 2010 target dates." On the other hand, there are some encouraging signs that the utilities are beginning to improve their efforts to procure renewable resources.

¹ For example, page 3 of D.07-12-052 states: "Our analysis determined that all three LTPPs were deficient and spotty in regards to addressing filling their net short position with preferred resources from the EAP loading order."

Section 3.2.2 of Attachment A to the ALJ's *Ruling* discusses the potential for California to procure renewable resources beyond the current statutory mandate of twenty percent. We find the overall tone of this section to be far too cautious. The two Commissions soliciting these comments have already adopted the stretch goal of achieving 33 percent renewables by 2020 in the *Energy Action Plan II*, a policy that is also embraced by the Governor, and under active consideration in the legislature for statutory emplacement. Considering the fact that Attachment A is concerned with identifying an array of emissions reduction measures that can achieve the goals of AB 32, we see no reason why the attachment would fail to enthusiastically endorse the 33 percent by 2020 benchmark as a key component of any realistic AB 32 compliance program. The endorsement in the Attachment is tepid at best.

We would also like to comment on the discussion of the intermittency of wind and solar resources in Attachment A. In our opinion, grid operators of the future need to take a more holistic approach to grid management for a carbon-restricted world. Grid operators have always lived with uncertainty and unpredictability, not only because loads are inherently unpredictable, but also because even the most dependable of resources occasionally fail, often under stress and without warning. When the resources come in large unit sizes the system effects can be significant. Intermittent resources add a new **component** to the unpredictability of loads and supplies on the grid. However, unpredictability per se is not something that is new to the grid. Hour-ahead and real-time management of the grid requires the balancing of all unscheduled deviations, including those relating to intermittent generators. We believe that there is too much focus on the unpredictability associated specifically with intermittent renewables, rather than taking it in the context of overall unpredictability of supply and demand on the integrated electricity grid.

Environmental Dispatch

Assuming that carbon values are incorporated into the cost-of-electricity production from fossil fuels due to the imposition of AB 32 regulations, and regardless of the details of the regulations that are eventually enacted, the process described in Attachment A as

“environmental dispatch” will occur naturally. Dispatch decisions are made on the basis of a single figure of merit: cost. To the extent that carbon constraints are translated into costs for generators who use fossil fuels, environmental dispatch will occur.

Conventional Resources

Attachment A correctly determines that carbon sequestration from coal-fired power generation is not relevant to the timeframe for compliance with AB 32,² which is now only twelve years away. We agree completely. Integrated gasification / combined cycle (IGCC) generation has been touted as the coal technology of the future for more than twenty-five years, and as Attachment A correctly points out, only four IGCC facilities have been built to date, leaving the technology still in the pre-, or very-early-commercial phase of development. Dependable carbon sequestration technology, in our judgment, will be far more difficult to develop and commercialize than IGCC technology has been. Until there is, at the very least, a sound demonstration of the technical viability of carbon sequestration, CCS should not be considered as a real option for meeting greenhouse gas emissions reduction goals in any timeframe of interest to planners or regulators.

In contrast to the case of carbon sequestration from coal generation, which should not be depended on for any contribution to compliance with AB 32, there are conventional non-carbon resource options that could indeed contribute toward AB 32 compliance: nuclear and large hydro. There is no a priori reason not to include these options in the discussion. While the amount of new hydro that might be available in the state is limited, there is no inherent limit on the expandability of nuclear generation in California and the WECC. While the GPI strongly supports the EAP’s preferred loading order, which clearly puts efficiency and renewables ahead of conventional generating sources, we believe that all options must be given due consideration in dealing with the very serious issue of global warming, and judged on their own merits. The GPI is confident that a combination of efficiency and renewables can do most or all of what is needed for AB 32 compliance in the electric sector. Nevertheless, we may very well need more zero-carbon resources in

² AB 32 requires the state to achieve statewide 1990 greenhouse gas emissions levels by 2020.

the future than the preferred resources can provide, for example if there is a major shift to transportation powered by grid electricity, and / or as we work towards long-term emission reduction goals that are significantly more stringent than those in AB 32, and conventional zero-emitting resources may be needed to fill the gap.

Biomethane

In our December 17, 2007, *Comments* on natural gas regulation issues in this proceeding, we noted, in a footnote on page 2:

It is possible to produce pipeline-quality gas from biomass and biogas sources, but the demand for these resources in other energy markets, including transportation fuels and electricity, makes it highly unlikely, in the GPI's opinion, that renewable resources will make a significant contribution to pipeline gas supplies in California.

PG&E is currently experimenting with injecting biogas into pipeline supplies, which they are currently taking credit for as equivalent renewable power generation towards their RPS target. It would be interesting to see whether they would continue to convert the gas into electric-equivalent credits for the RPS, or whether they would use it toward a carbon-constrained natural gas supply, if the gas sector were capped as part of the state's AB 32 regulatory program. The answer, of course, depends in large part on the specifications of the yet-to-be developed regulations.

Questions in Ruling

Question Q2 on page 5 of the ALJ's *Ruling* asks whether any of the measures identified in Attachment A should **not** be implemented as a means to achieving emission reductions within the context of AB 32. We believe that none of the coal-based technologies discussed in the Attachment, including IGCC, should be implemented as a means to achieving AB 32 mandates. The reason is simple: as the Attachment acknowledges, carbon-sequestration is simply not an option for the timeframe in which AB 32 mandates are to be achieved, and in our opinion it would be imprudent to consider it a viable option for the period immediately following the AB 32 compliance timeframe.

Question Q4 on page 5 of the ALJ's *Ruling* asks: "What means beyond policies currently adopted by the two Commissions hold potential for the integration of additional renewable resources into the grid?" We believe that the obvious answer to this question would be for the Commissions to formally adopt and implement the thirty-three percent renewables by 2020 target that was endorsed by the two Commissions as part of EAP II.

Modeling Approach and Data Sources

While the model itself appears to be well thought out, and takes into account all of the known variables today, we are concerned about the utility of the entire modeling exercise. The problem is that the uncertainties in this kind of analysis are so large that they tend to swamp any results that are produced. We are simply not confident that it is reasonable to expect to get a meaningful look at what will happen all the way out to 2020. There is a great deal of current research and technology development going on now that could have a significant impact on the future AB 32 compliant energy system, which cannot be modeled at the present time. Moreover, federal laws and regulations may very well change in the near future, which means that any model that works for California's situation today may have to change extensively after a year or two. While it is a useful exercise to attempt to try to model a variety of scenarios, there needs to be other ways to evaluate policy options as well.

The GPI believes that the greenhouse gas calculator could usefully be augmented to allow the user to create more than one case to compare to the base case on the same spreadsheet and graphs. This would be an important addition to the tool because it would allow the user an opportunity to consecutively change a variable of interest, and see the progressive impacts of changing it. At the present time, we find that when using the calculator every time we wanted to change something we lost what we had done before, and could not see the specific changes we had made. Currently a user would have to make a printout each time he changed something to see what had happened, and even then there would be no way to show the progressive changes. We think that the calculator could be upgraded to do this fairly easily, and it would make the tool a good deal more useful.

Questions in Ruling on the E3 Calculator

Q6) Does E3's modeling documentation adequately document the methodology, inputs, and other assumptions underlying its model? If not, what additional documentation should be added?

The documentation does provide enough information to use the model on a basic level. It would be helpful if it provided a detailed example user case that took the user through the process of building an entire scenario. The spreadsheet itself shows all of the inputs and methodology clearly.

Q7) Provide feedback, as desired or appropriate, on the structure and approach taken by E3 in its GHG Calculator spreadsheet tool.

The Calculator tool shows the inputs and outputs very well, and allows the user to compare a user-made scenario with one of the two cases that E3 has created: business as usual or aggressive policy. While it is helpful to compare the user-created cases with the two base cases, it would be desirable to be able to compare multiple user cases with either one, or both, of the E3 cases on the same output grid. This way a user could progressively change one or more input variables and see the changes that occur, with, for example adding more and more energy efficiency or renewables. It is difficult at the current time to see these kinds of changes while only one user case and one base case can be compared.

Q8) Provide feedback, as desired or appropriate, on the data sources used by E3 for its assumptions in its issue papers. If you prefer different assumptions or sources, provide appropriate citations and explain the reason for your preference.

The GPI apologizes, but we were unable to devote the time necessary to address this question in time to comment on it in this set of *Comments*. It is our understanding that this issue will be addressed in much greater detail in stage 2 of the E3 project, and we reserve the right to address data issues during stage 2.

Q9) Are uncertainties inherent in the resource potential and cost estimates adequately identified? Does E3's model provide enough flexibility to test alternative assumptions with respect to these uncertainties?

The uncertainties are definitely identified by E3, and the model does allow a user to test alternative assumptions. However, there are so many uncertainties and alternative assumptions possible that comparing them all is very difficult. We are not sure that any model could adequately test all of the various uncertainties pertaining to resource potential and cost estimates, especially as new technology and more money pours into new resources and development. This means that while the model allows the user to test different scenarios that can be envisioned now, it does not necessarily give an accurate picture very far into the future, as cost and resource potential change, and the market changes as well.

Q10) Has the E3 model adequately accounted for the implications of increased reliance on preferred resources (renewables, efficiency) on system costs?

The model does appear to account for the increased reliance on these resources; however it has a more difficult time taking into account changes in the markets or technology (see above). This hinders the model's ability to accurately forecast costs into the future. Not surprisingly, it is much better at shorter term estimations. This is not a criticism directed at the E3 calculator per se. We do not think that any model could do the desired job. There are simply too many changes happening in the industry that cannot be taken into account in any model.

Q11) Should E3's model, in Stage 2, attempt to model potential market transformation scenarios, in the form of cost decreases, new technologies, or behavioral changes? What might be an appropriate way to characterize such potential for market transformation?

The GPI thinks that it is very important for Stage 2 to model these potential market transformation scenarios, as part of the CPUC's program is meant to support these market transformations, and the country as a whole is moving towards a system that will create these transformations. E3 may wish to create a few more cases in the calculator tool that could model what would happen in various market transformations, for example a case in which a new technology made renewables more cost effective, or in which a strict cap and trade system was imposed, etc. These new cases would be in addition to the aggressive

policy and business as usual cases, and would allow the user to see how the variables change with the addition of market transformations.

Q12) What specific flexible GHG emission reduction mechanisms to mitigate the economic impacts of achieving the desired GHG emission reductions should be modeled in Stage 2?

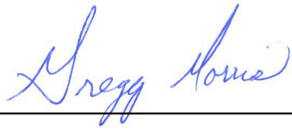
In our opinion, the cap and trade system absolutely should be modeled in stage 2, as that appears to be a mechanism that will be used as part of the future regulatory program. We do not know what other mechanisms might be employed for mitigating economic impacts, but the more mechanisms modeled the better, especially so that costs vs. benefits can be easily compared.

Conclusion

We believe that the two Commissions have succeeded in identifying all of the quantitatively important options that can be employed to permit California to achieve the mandates in AB 32, the 2006 Global Warming Solutions Act. In particular, we believe that most or all of the reductions required in the electric sector can be provided by the state's preferred resources of efficiency and renewables. These resources should be the major focus of state electricity policy over the coming years.

The E3 greenhouse gas calculator model appears to be a valiant attempt to do a job that may, in fact, be overly ambitious. We believe that the model can provide valuable insights if used carefully, but that there is a significant potential for the large inherent uncertainties in the model's data and assumptions to override the results it produces. The one significant enhancement to the model that we would like to see would be to allow the user to create more than one case to compare to the base case on the same spreadsheet and graphs.

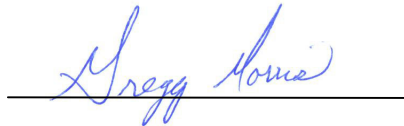
Dated January 4, 2008, at Berkeley, California.
Respectfully Submitted,



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PROOF OF SERVICE

I hereby certify that on January 4, 2008, I have served a copy of the COMMENTS OF THE GREEN POWER INSTITUTE ON MODELING-RELATED ISSUES upon all parties listed on the Service List for this proceeding, R-06-04-009. All parties have been served by email or first class mail, in accordance with Commission Rules. This document is also being filed at the CEC in docket no. 07-OIIP-01.



Gregory Morris